

REMARKS / ARGUMENTSStatus of Claims and The Present Invention

Claims 1-13 remain pending in the present application. No claims have been canceled.

By the foregoing amendments, independent Claims 1, 5, 9 and 10 have been amended to more clearly recite the novel features of the present invention. No new matter is believed to have been added to the claims by these amendments.

It is noted that the present invention generally relates to a plastic additives powder composition, a method for preparing same, a thermoplastic resin blend comprising same, and a method for modifying a thermoplastic resin blend with same. As explained in paragraphs [0011]-[0012] of the published version of the present specification, US 2004/0077756, the plastic additives powder composition of the present invention is, generally speaking, a combination of impact modifier particles and at least one type of processing aid particles (i.e., 0 to 48 parts by weight of first processing aid particles and 2 to 50 parts by weight of second processing aid particles). This combination provides unexpected advantages compared to the results that persons of ordinary skill would expect from employing impact modifiers and processing aids separately in thermoplastic resins. More particularly, in paragraph [0011] of US'756, Applicants explained:

... The present inventors have discovered new plastics additives powder compositions that combine the functionality of a high rubber IM with the functionality of a PA without requiring an encapsulating shell and without requiring that the mean particle size of the IM and PA is less than 100 nm diameter. The plastics additives of the present invention further provide improved, impact strength and processing characteristics compared to using equal amounts of separate impact modifier and processing aids in PVC formulations. Enhanced impact strength results by providing plastic additive powders containing IM particles having rubber contents exceeding 88% by weight of the IM, while excellent powder properties and processing aid functionality are provided by the method of coagulating these high rubber IM particles with PA particles. As a result, the plastics additives of the present invention provide thermoplastic resin formulators with: (1) ease of use in handling one powdery additive rather than two (both an IM and a PA); (2) reduced costs by allowing less total plastics additives to be used; and (3) improved impact properties as powdery

impact modifiers containing greater than 88% rubber are now possible.
(emphasis added).

Additional discussion of the unexpected advantages of combined impact modifiers and processing aids is provided in paragraph [0012] of US'756:

... Unexpectedly, we have found that the impact and processing properties achieved by the particular compositions of the present invention are more efficient and/or provide performance improvements compared to using the separate IM and PA powders. The PA particles also function to affect the preparation of high rubber IM polymer particles having rubber weight fractions greater than 88% as a free-flowing powder. Moreover, the PA particles further function to increase the dispersibility of such high rubber soft polymer particles in thermoplastic resins. (emphasis added).

Thus, in particular, each of independent Claims 1, 5, 9 and 10 has been amended to specify that the impact modifier particles have a high rubber content, i.e., "80 to 100 by weight of at least one rubbery polymer". This feature is supported by the original disclosure, i.e., the present specification, US'756, at paragraph [0052].

Furthermore, each of independent Claims 1, 5, 9 and 10 has been amended to clarify that the second processing aid, which is required rather than optional, has a molecular weight of at least 1,000,000 g/mol. This feature is supported by the original disclosure, i.e., original Claim 4, and the present specification, US'756, at paragraphs [0009] and [0061]. It is noted that the molecular weight is defined in the specification, US'756, at paragraph [0050], as being a weight average molecular weight.

Thus, it is believed that none of the foregoing claim amendments introduce new matter into the present application. Accordingly, their entry is hereby requested.

The Present Invention As Claimed

Initially, it is noted that Claims 1-10 are intended, in general, to cover a composition which is a combination of impact modifier particles having high rubber content and a mean particle size greater than 100 nm, and at least one type of processing aid particles having a molecular weight of at least 1,000,000 g/mol, as well as a method for preparing the composition, a thermoplastic resin blend comprising the

aforesaid composition, and a method for modifying a thermoplastic resin with the aforesaid composition. Claims 11-13 are intended, in general, to cover an acrylic-based impact modifier composition having high rubber content and a mean particle size of greater than about 100 nm.

As recited in amended independent Claim 1, the present invention is a plastics additives powder composition providing a combination of impact modifying and processing characteristics in thermoplastic resins. In particular, the powder composition of the present invention comprises: (a) from 50 to 98 parts by weight of impact modifier particles; (b) from 0 to 48 parts by weight of first processing aid particles; and (c) from 2 to 50 parts by weight of second processing aid particles. As also recited in amended independent Claim 1, among other things, the impact modifier particles have 80 to 100 parts by weight of at least one rubbery polymer and a mean particle size greater than 100 nm, and the second processing aid particles have a molecular weight of at least 1,000,000 g/mol.

Another embodiment of the present invention, as recited in original independent Claim 4, is also a plastics additives powder composition providing a combination of impact modifying and processing characteristics in thermoplastic resins. In this embodiment, the powder composition of the present invention comprises: (a) from 82 to 93 parts by weight of impact modifier particles; (b) from 5 to 10 parts by weight of first processing aid particles; and (c) from 2 to 8 parts by weight of second processing aid particles. As also recited in independent Claim 4, among other things, the impact modifier particles have a mean particle size greater than 100 nm and comprising from 89 to 94 parts by weight of at least one rubbery polymer, and 6 to 11 parts by weight of at least one hard polymer. The first and second processing aid particles both each have a mean particle size greater than 100 nm and a molecular weight greater than 1,000,000 g/mol.

As recited in amended independent Claim 5, the present invention is a method for preparing a plastics additives powder providing a combination of impact modifying and processing characteristics in thermoplastic resins. In particular, the method of the present invention comprises: (a) preparing a first aqueous particle dispersion; (b) coagulating the first aqueous particle dispersion to form a coagulated slurry; (c) adding

a second aqueous particle dispersion to the coagulated slurry; and (d) drying the coagulated slurry to less than 5 weight percent water to form a free-flowing powder. As further recited in relevant part in amended independent Claim 5, the first aqueous particle dispersion comprises: (i) from 50 to 98 parts by weight of impact modifier particles, the impact modifier particles comprising 80 to 100 parts by weight of at least one rubbery polymer and having a mean particle size greater than 100 nm; and (ii) from 0 to 48 parts by weight of first processing aid particles. The second aqueous particle dispersion comprises from 2 to 50 parts by weight of second processing aid particles having a molecular weight of at least 1,000,000 g/mol.

Still another embodiment of the present invention, as recited in amended independent Claim 9, is a thermoplastic resin blend, comprising: (A) a thermoplastic resin, and (B) the plastics additives powder composition of amended independent Claim 1 described hereinabove, wherein the weight ratio of (A):(B) is in the range of from 1:99 to 99:1. Of course the powder composition comprises: (a) impact modifier particles comprising 80 to 100 parts by weight of at least one rubbery polymer and having a mean particle size greater than 100 nm, (b) optional first processing aid particles, and (c) second processing aid particles having a molecular weight of at least 1,000,000 g/mol.

A method for modifying a thermoplastic resin is also provided by the present invention, as recited in amended independent Claim 10. More particularly, the method of independent Claim 10 comprises: (I) melt blending: (A) a thermoplastic resin; and (B) the plastics additives powder composition of amended independent Claim 1 described hereinabove, wherein the weight ratio of (A):(B) is in the range of from 1:99 to 99:1. Of course the powder composition comprises: (a) impact modifier particles comprising 80 to 100 parts by weight of at least one rubbery polymer and having a mean particle size greater than 100 nm, (b) optional first processing aid particles, and (c) second processing aid particles having a molecular weight of at least 1,000,000 g/mol.

Lastly, a further embodiment of the present invention, as recited in independent Claim 11, relates to an acrylic-based impact modifier composition for poly(vinyl chloride) having high rubber content. More particularly, the impact modifier composition comprises a) at least 92 weight percent of a rubber compound having a glass transition

temperature of less than 25°C, and b) a shell, wherein the shell is disposed externally to the rubber compound, and wherein the shell is at least partially grafted to the rubber compound. As also recited in independent Claim 11, the impact modifier has a mean particle size of greater than about 100 nanometers.

Claim Rejections

On page 2 of the Office Action, Claims 1-13 have been rejected, under 35 U.S.C. § 102(b), as being anticipated by US Patent No. 4,696,973 (Kamata et al.). Applicants respectfully traverse this rejection for the following reasons.

Kamata et al. fails to anticipate the present invention as recited in Claims 1-10 because it fails to disclose all the features of the present invention as recited in each of independent Claims 1, 4, 5, 9 and 10. More particularly, each of independent Claims 1, 4, 5, 9, and 10 requires the presence of impact modifier particles comprising 80 to 100 parts by weight of at least one rubbery polymer and at least one type of (i.e., "a second") processing aid particles having a molecular weight of at least 1,000,000 g/mol. As acknowledged by the Examiner, Kamata et al. discloses an acrylic-based impact modifier. Furthermore, the impact modifiers disclosed by Kamata et al. are a blend of two copolymers (graft copolymer (A) and co[polymer (B)]), but even if copolymer (A) and copolymer (B) of Kamata et al. were to be compared to the impact modifier and processing aid of the present invention, respectively, is clear that they are not the same, nor analogous.

More particularly, copolymer (A) of Kamata et al. is a lower rubber content polymer, having between 50 and 80 parts by weight, based on a total of 100 parts, of rubber (i.e., "acrylic elastomer") (see Col. 3, line 57 to Col. 4, line 4, and Claim 2 of Kamata et al.). The impact modifier particles of the present invention, however, are required to have from 80 to 100 parts by weight of at least one rubbery polymer, based on 100 total parts, as recited in each of independent Claims 1, 4, 5, 9 and 10.

Furthermore, copolymer (B) of Kamata et al. is another impact modifier type of particle, not a processing aid. In addition, persons of ordinary skill in the art would also readily recognize from the description of the Examples of Kamata et al. (for example, the preparation procedure provided at Col. 6, lines 45-57) that the molecular weight of

the copolymer (B) could not reach up to 1,000,000 g/mol. The present invention, on the other hand, requires that the necessary processing aid particles have a molecular weight of at least 1,000,000 g/mol, as is also recited in each of independent Claims 1, 4, 5, 9 and 10.

Thus, Kamata et al. fails to anticipate any of the embodiments of the present invention as recited in each of independent Claims 1, 4, 5, 9 and 10, as well as dependent Claims 2-3 and 6-8 which depend directly or indirectly therefrom. Accordingly, withdrawal of this rejection as applied to Claims 1-10, based on Will et al., is hereby respectfully requested.

With regard to the rejection of Claims 11-13 based on Kamata et al., it is respectfully submitted that the disclosure of Kamata et al. also fails to anticipate the present invention as recited in independent Claim 11. As discussed hereinabove, the impact modifier particles of Kamata et al. have a rubber content of only up to 80 weight percent, whereas the acrylic-based impact modifier composition of the present invention, as recited in Claim 11, requires at least 92 weight percent of a rubber compound. Thus, the impact modifier of Kamata et al. is different from the impact modifier composition of the present invention as recited in independent Claim 11, as well as in dependent Claims 12 and 13 which depend therefrom. Accordingly, withdrawal of the rejection of Claims 11-13 based on Kamata et al. is hereby respectfully requested.

Also on page 2 of the Office Action, Claims 1-13 have been rejected, under 35 U.S.C. § 102(b) as being anticipated by EP 0 527 605 A1 (Wills). Applicants respectfully traverse this rejection for the following reasons.

Wills et al. fails to anticipate the present invention as recited in Claims 1-10 because it fails to disclose all the features of the present invention as recited in each of independent Claims 1, 4, 5, 9 and 10. More particularly, each of independent Claims 1, 4, 5, 9, and 10 requires the presence of impact modifier particles having a mean particle size greater than 100 nanometers and at least one type of (i.e., "a second") processing aid particles. As acknowledged by the Examiner, Wills et al. discloses a core-shell polymer useful as an impact modifier. Wills et al. fails entirely to discuss blending

processing aid particles with the disclosed core/shell polymer, contrary to the present invention which requires a combination of at least two types of particles – impact modifier particles and at least one type of processing aid particles.

Furthermore, the impact modifier particles disclosed by Will et al. are, in fact, double-shelled core/shell polymers and, therefore, any meaningful analogy must be drawn between the core-and-intermediate-shell particles of Wills et al. and the impact modifier particles of the present invention. In particular, the core-and-intermediate-shell particles of Wills et al. have a mean particle size less than 100 nm (i.e., from 62 to 90 nm, see table provided in Example 3 of Will et al., column entitled "Particle Size"), whereas the impact modifier particles of the present invention must have a mean particle size greater than 100 nm, as recited in each of independent Claims 1, 4, 5, 9 and 10.

Thus, Wills et al. fails to anticipate any of the embodiments of the present invention as recited in each of independent Claims 1, 4, 5, 9 and 10, as well as dependent Claims 2-3 and 6-8 which depend directly or indirectly therefrom. Accordingly, withdrawal of this rejection as applied to Claims 1-10, based on Will et al., is hereby respectfully requested.

With regard to the rejection of Claims 11-13 based on Wills et al., it is respectfully submitted that the disclosure of Wills et al. also fails to anticipate the present invention as recited in independent Claim 11. The core-and-intermediate-shell particles of Wills et al. have a rubber content of less than 92 weight percent (i.e., only up to 91 weight percent, see table provided under Example 3 of Wills et al., column entitled "Emulsion Rubber Level" – only non-shelled particles contain greater than 92 wt % rubber and are, therefore, not core/shell particles at all). The acrylic-based impact modifier composition of the present invention, as recited in Claim 11, on the other hand are required to comprise at least 92 weight percent of a rubber compound. Thus, the core-and-intermediate-shell particles of Wills et al. are different from the impact modifier composition of the present invention as recited in independent Claim 11, as well as in dependent Claims 12 and 13 which depend therefrom. Accordingly, withdrawal of the rejection of Claims 11-13 based on Wills et al. is hereby respectfully requested.

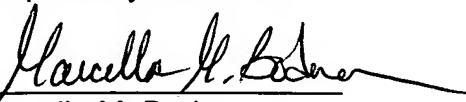
On page 3 of the Office Action, Claims 11-13 have been rejected, under the judicially created doctrine of obviousness type double patenting, as being unpatentable over all claims of US Patent No. 6,624,212 (Weier et al). Applicants' attorney has submitted herewith a Terminal Disclaimer to disclaim any portion of the term of a patent which issues from the present application and extends beyond the full statutory term of US Patent No. 6,624,212. Thus, it is believed that this rejection has been adequately addressed and obviated by the accompanying Terminal Disclaimer. Withdrawal of this rejection of Claims 11-13 is hereby respectfully requested.

Conclusion

Based on the foregoing amendments and discussion, it is believed that the subject matter of Claims 1-13 are patentable over each of Kamata et al., Wills et al., and US Patent No. 6,624,212. Accordingly, re-examination and allowance of Claims 1-13 are hereby respectfully requested.

No extension fees are believed to be due in connection with the submission of this Amendment, since it is being submitted within three months after the originally set due date for response to the non-final Office Action. The \$130 fee for the accompanying Terminal Disclaimer is addressed by a charge authorization at the end of the Terminal Disclaimer itself. No additional fees are believed to be due. If, however, any such fees, including petition and extension fees, are due, the Commissioner is hereby authorized to charge such fees to **Deposit Account No. 18-1850**. In the meantime, please direct all future correspondence relating to the present application to the undersigned attorney.

Respectfully submitted,



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